Noteworthy systematic and distributional researches.

Recent work in systematic hepaticology.

For a long series of years the systematic study of Hepaticæ seemed to be held in abeyance to the settlement of various morphological problems, and the earlier activity of Nees von Esenbeck, Gottsche, Lindenberg, De Notaris and Sande-Lacoste on the systematic side came to a close midway in the fifties and was revived only by a few descriptive papers by Mitten in the sixties. Starting with the period of Hofmeister and Grönland in the fifties the study of the morphology and development of the group culminated after the preliminary investigations of Kny, Kienitz-Gerloff and Leitgeb in the masterpiece of the latter in 1881.[1] Commencing in the seventies and coming down to the present, some of the best descriptive work among the Hepaticæ has been accomplished largely by representatives of four European countries: Spruce, Pearson and Mitten of England, Lindberg (now deceased) of Finland, Massalongo and De Notaris of Italy and Stephani in Germany. The last decade especially has been prolific in new forms and the recorded number[2] of Hepatics in Synopsis Hepaticarum (1844) has been nearly doubled.

Spruce, whose masterpiece on the Hepaticæ of the Amazon and Andes, is well known, has described recently[3] thirty-four American species mostly from South America, three only being from Mexico. Jack and Stephani have described 18 new species from Peru and the United States of Columbia. Stephani has described two Hepaticæ from North America which were collected by Dr. Julius Röll, besides the Lejeuneas described in the June GAZETTE.

Asiatic Hepaticæ have been described by Lindberg and Arnell,[6] who enumerate all the known species of Asiatic Russia (96) three of which are new; and by Mitten[7] who enumerates

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[1] LEITGEB: Untersuchungen über die Lebermoose, 4to, Graz, 1874-81.

[2] 1641 species: Luerssen in his *Handbuch der systematischen Botanik* (1879), curiously estimates the known species at 1300. The number will prove to be not far from 3000.

[3] Hepaticæ Novæ Americanæ tropicæ et aliæ. Bull. de la Soc. Bot. de France, XXXVI, pp. CXXXIX—CCVI.

[4] Hepaticæ Wallisianæ. Hedwigia, XXXI, 11–27 (1892).

[5] Bot. Centralb. XLV, 203—4 (1891): Marchantia Oregonensis (Oregon) and Porella Roellii (Washington).

[6] Musci Asiæ Borealis, Kongl. Svenska Vet.-Akad. Handl. XXIII, no. 5, (1889).

[7] On the species of Musci and Hepaticæ recorded from Japan. Trans. Linn. Soc., Botany, III, part 3, (1891).

all the known species of Japan (74) of which thirteen are new; he also describes two Chinese Frullanias.

From Africa numerous contributions have been made to our yet scanty knowledge of the hepatic flora of the Dark Continent largely through German exploring parties. Dr. F. Stephani of Leipzig has described these, his latest papers[8] including 31 new species. Renauld and Cardot[9] publish a list of 190 species of Hepaticæ from Bourbon, Mauritius and Madagascar ; a number of new species are mentioned but not described. Pearson[10] describes three new Frullanias from Madagascar.

From Australia a considerable number of species have been described in recent years by Stephani, and Carrington and Pearson, but the greatest number of novelties has been described from New Zealand by Colenso in a series of papers in the Transactions of the New Zealand Institute.

The species of the Sandwich Islands have been brought together by one of our own countrymen, Mr. A. W. Evans of New Haven[11]; 117 species are included in this list, of which five are new. Several of Austin's MS. species are also described. In addition to the species of this list 22 species were described from these islands by Mitten in Flora Vitiensis and *Anthoceros Hawaiensis* by Reichardt in 1877, thus bringing the list up to 140 species which number will be doubtless increased when some modern collecting is undertaken there.

In all the above descriptive papers, the diagnoses are full and are strongly in contrast with many of the two-line descriptions of some cryptogamic writers who have caused untold trouble by their brevity and inaccuracy. Many of the species, especially those in the larger genera, are figured.

Besides the above systematic papers we have an "Arrangement of the Genera of Hepaticae", by Mr. Evans,[12] which is highly creditable and will prove very useful. His estimates for the number of species are cautious and usually low. *Bazzania*, for instance, is credited with 100–125 species while

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[8] Hepaticæ Africanæ. Hedwigia, xxx, 201—217, 265—272 (1891). Earlier papers with same title have been published by Stephani in Engler's Bot. Jahrbücher (1886), Hedwigia (1888), and Botanical Gazette (1890).

[9] Revue Bryologique, xviii, 55—60 (1891).

[10] Frullaniæ Madagascarenses. Christiania Vid.-Sel. Forhandl. 1890, no. 2 (1891).

[11] A Provisional List of the Hepaticæ of the Sandwich Islands. Trans. Conn. Acad. viii, [pp. 1—9] (1892).

[12] Trans. Conn. Acad. viii [pp. 20] 1892.

Stephani in 1886 gives a list of 169 which even then was not quite complete. The species of *Metzgeria* have doubled since Lindberg wrote his monograph which is quoted as giving eleven species. We note the absence of three of Mitten's genera, *Conoscyphus*, *Mastigopelma* and *Plectocolea*. *Cronisia* Berkeley, which Lindberg changed to *Carringtonia* because he did not believe in anagrams,[13] is also omitted from the series. So also are some of Trevisan's innovations,[14] but possibly the less said of these the better. The widely scattered literature has rendered this work by Mr. Evans specially difficult. [15] A number of generic names will have to be replaced on grounds of priority whenever we have a sufficiently stable system on which to make the shift. One hundred and seventeen genera are included, of which 87 belong to the Jungermaniaceæ. And yet the text-books persist in regarding Marchantia as a representative liverwort! — LUCIEN M. UNDERWOOD.

The psammophilous flora of Denmark.

Prof. Warming presents a sketch of the peculiar vegetation of the dunes and sandy plains in Denmark,[16] arranged according to their occurrence in the following zones: (I) "The psammophilous *Halophyta*" from the sandy strand; (II) "the vegetation characterized especially by the grass *Psamma*" from the dunes along the coast; and (III) "the *Weingærtneria*-vegetation," where this grass prevails, and which has been observed on the sandy banks along the coast or in the interior of the country.

In the first of these "formations" the characteristic is the *Halophyta*, which live here on a loose, sandy and salt-bearing soil, the surface of which is very dry and warm during certain seasons. This vegetation does not form any dense growth, since the consistency of the soil is very variable. The plants belong to two categories; annuals or perennial herbs mostly with widely creeping rhizomes, while trees and shrubs are almost absent. Among the annuals are Cakile, Salsola,

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[13] Cronisia was based on *Corsinia* which it resembled.

[14] VITTORE TREVISAN: Schema di una nuova classificatione delle epatiche. Mem. R. Ist. Lomb. di Scienze e Lettere, ser. III, IV, (1877).

[15] There is needed a classified bibliography of the Hepaticae and on this we have been working for several years and hope to reach publication of the first part (author catalogue) in a few months.

[16] EUG. WARMING: De psammophile Formationer i Danmark. Videnskap. Meddel. Naturh. For. Kjöbenhavn 1891.